The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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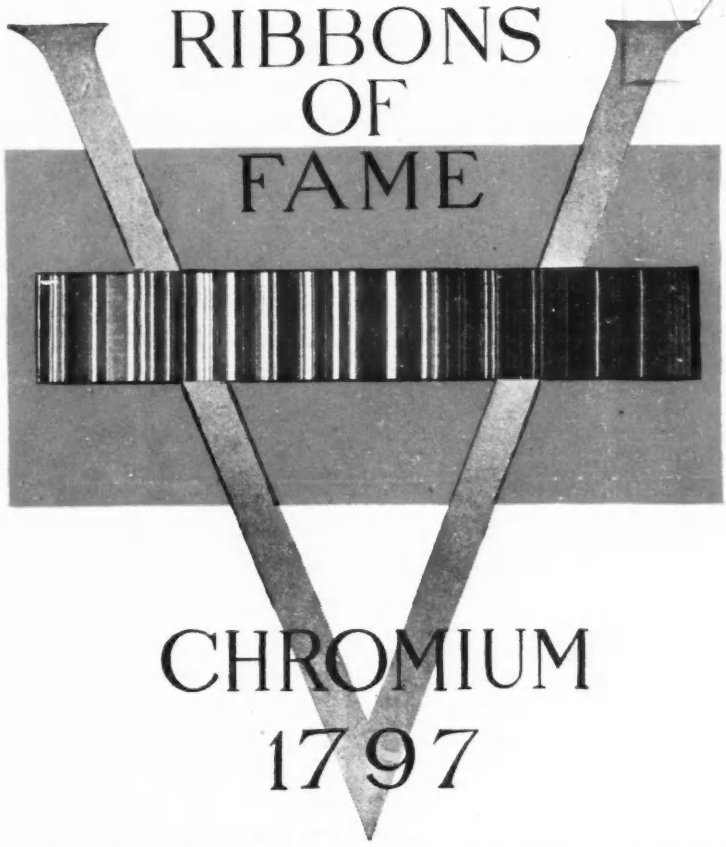

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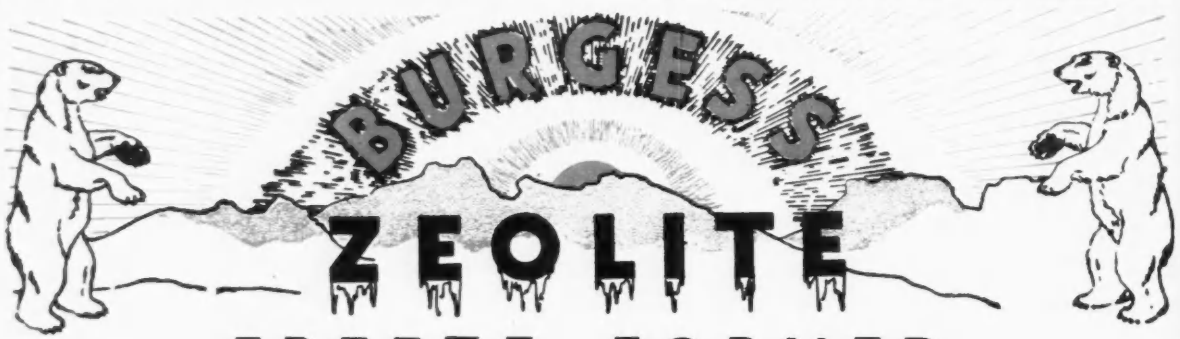

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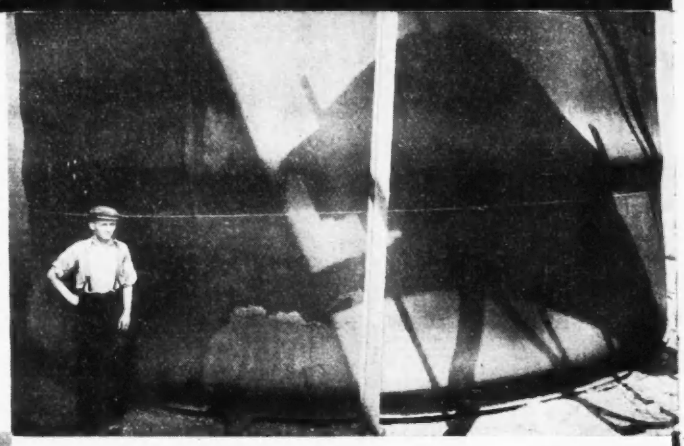

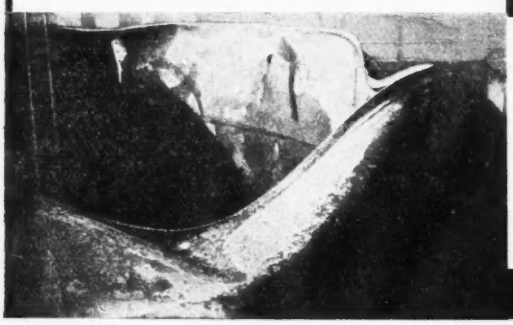

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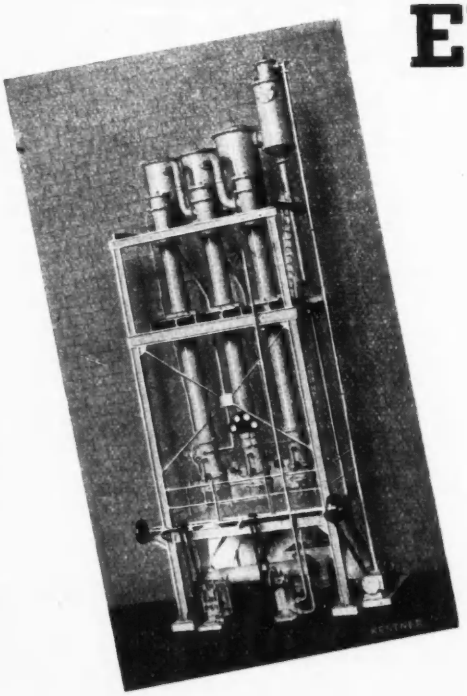

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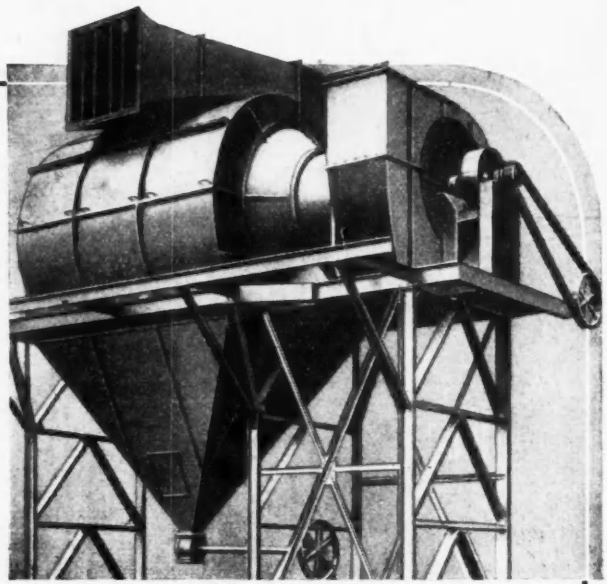

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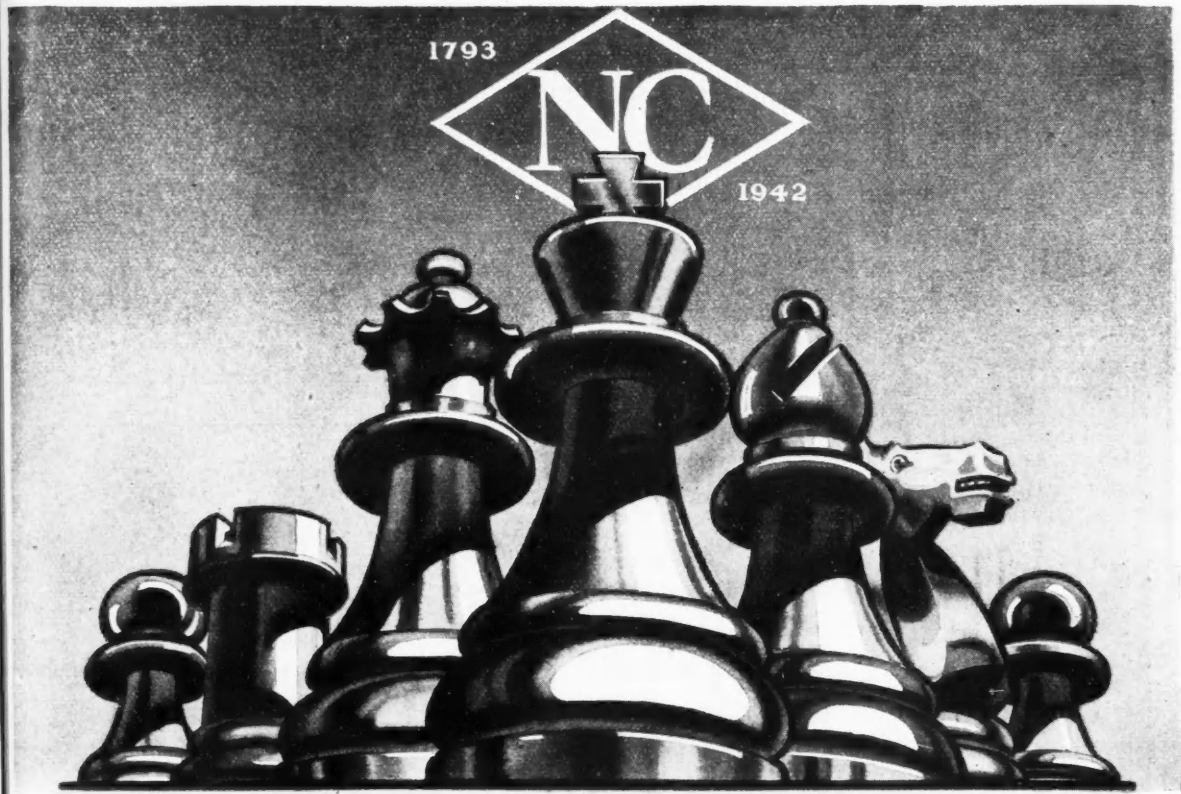

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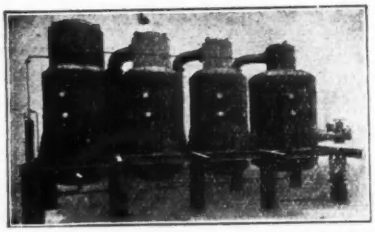

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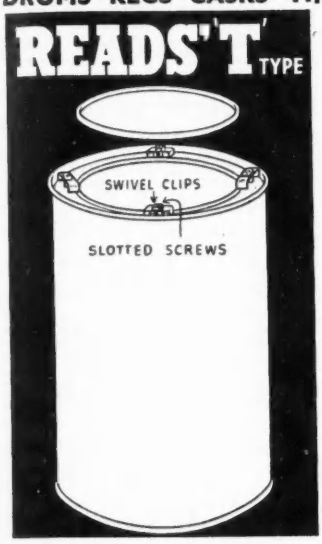

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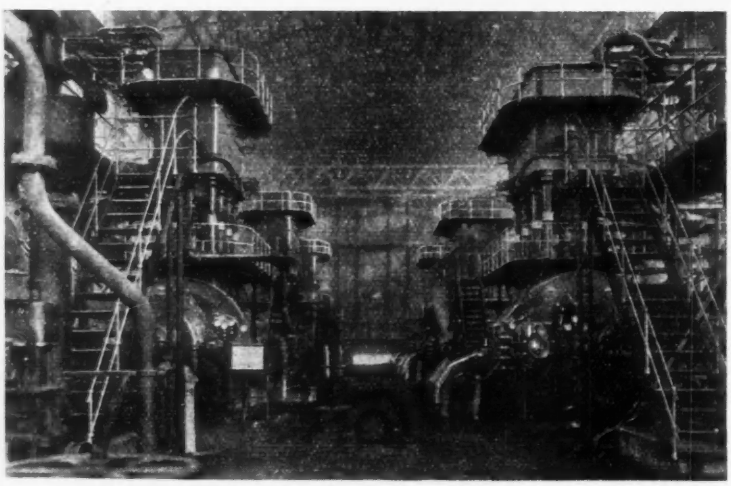

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The Development of a Process

THE Chemical Engineering Group, at what was presumably the last meeting of the season, browsed happily over the interesting topic of the development of a chemical process. It cannot be said that the debate was in itself crystallised or that it kept very much to the point. That is perhaps inevitable in a discussion for which no agreed syllabus was laid down in advance. Of the many angles of the problem that were examined perhaps one stands out above the others in its fundamental importance. In introducing the subject of the development of a chemical process, Mr. Cremer appeared to have in mind something more than the development of a process from the laboratory scale. There can be no doubt that the general subject of the development of chemical processes is highly important, because it is only through the development of new processes that new industries can be started and new opportunities for employment given to the many who will need it after this war. There is, therefore, a distinction to be drawn between the position of a firm that decides to manufacture a particular product and sets out to discover how to do it, and that of a nation looking for further employment for its man power through the setting up of new industries.

All industries have small beginnings. They usually start with an experiment on the test-tube scale; Bakelite, artificial silk, and synthetic dyestuffs are all examples of this. Most new industries, moreover, start by the work of an individual who recognises, either by some chance observation of his own or by studying the work of others, that there is something of industrial importance to be obtained in a manner hitherto unforeseen. It is not very often that men in a group see the opportunity for developing a major new process and thus engage consciously in its development. That follows the work of the gifted individual. Mr. Cremer's theme was that of the need for collaboration between the academic bodies, the chemical manufacturer, and the chemical plant manufacturer. He urged that the work for the development of any particular process should be allocated, according to the type of work involved, either to academic research men, who might be final-year students working for higher degrees at universities, or to industrial research organisations. With complete collaboration on research and plant development, progress should be rapid.

This opens the major development problem of post-war chemical industry. There are in industry a number of factors, both relating to existing chemical processes and required for new chemical processes, which are not fully understood. These problems, which are of interest to chemists and chemical engineers generally, are fit work for the academic chemist or for the research association. There is a great deal of duplication in the research laboratories of the country, and not infrequently better results would be obtained if the problem was given to one strong laboratory to work out at its leisure rather than tackled in a less complete manner by individual laboratories likely to be satisfied with approximations to the truth for their own specific problems.

The need for long-range research must never be forgotten. The electrical industry, to mention only one, owes its inception to research so long in range that no one could have foreseen an industrial application in its early stages. There are thus two possibilities for developing new chemical processes. The first is that men with vision should see in long-range pure research the opportunity for long-range industrial research; there are also the developments which arise as a result of competition and for other reasons in the light of which individual firms decide to develop a particular process for a particular purpose. What, then, should be the post-war organisation of the chemical industry and of chemical research? It may be suggested that there should be an advisory council of strong industrialist scientists and academic men of vision charged with the task of examining all chemical literature as published with a view to deciding how far it can be made the basis for future work of industrial importance. Whether that scheme would be successful or not is a matter for debate. There are those who believe with considerable justification that a committee of this sort would never get anywhere, since long-range vision is given only to the few. What seems to be certain is that a team of these gifted individuals (if they can be found) should be given the leisure to examine literature and to think upon the problems which occur to them or are proposed by their fellows.

Another suggestion is that the chemical industry should have a combined research association of its own to which certain vital problems of general or particular application should be put; that this should be controlled by an advisory body to decide whether a problem was of sufficient importance to have work done upon it at the expense of the organisation or whether the individual requiring a solution of the problem should himself bear the expense. At all events, it would be a good thing if some means could be adopted for speeding up the tempo of industrial research, as it is scarcely an overstatement to say that the future depends upon success therein. All the civilised industrial nations of the world are spending vast sums on this type of research, and we may well ask in what direction British chemical and engineering research can most usefully be developed.

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NOTES AND COMMENTS

Utilising Cellulose

CELLULOSE is the commonest organic raw material in the world, but its uses so far have been somewhat rigidly confined; and one of the most significant tendencies of the present day is the intensive study that is going on, in Germany and countries under German domination, towards the extension of the use of cellulose, especially wood-cellulose, to more and more purposes. The reason may, of course, be simply scientific curiosity and the natural desire to bring "waste" products into commercial use; on the other hand shortage of normal raw materials may be enforcing the search for other sources, and we venture to suggest that the "cellulose drive" is due to the latter cause rather than the former.

Wood Food and Wood Clothing

AS a food, wood-cellulose has distinct disadvantages. So far as we know, only the termite and her congeners are equipped with a digestive equipment that can tackle raw wood-cellulose as food, being provided with a supply of cellulose-digesting bacteria, which presumably produce a "cellulase." Somehow or other, before cellulose can be of use to other animals as a fodder, a chemical enzymatic process must be devised to do the work that the termites' bacteria perform. Such processes have been worked out, and are now being put into practice in timber-producing countries where the normal outlet of forest products has become restricted owing to the blockade. Yet another outlet for cellulose is as a fibre to replace natural fibres. *Zellwolle* has long been a subject of discussion among German textile chemists; and with the increasing difficulty of obtaining natural wool, the impetus to manufacture cell-wool has been stimulated. Considerable claims for various types of this fibre have been made, as may be read elsewhere in these pages; but it must be remembered that Nazi political economy is (to say the least of it) peculiar, and the authorities concerned are keeping very quiet as to the cost of manufacture. Artificial silk and many of the so-called synthetic rubbers are of true economic value, irrespective of their cost, because of some outstanding virtue. It has yet to be shown that cell-wool possesses any such prime advantage which might offset the undoubted expensiveness of its manufacture.

American Synthetic Rubber

ARTICLES on the possiblities of synthetic rubber manufacture continue to pour out of the Press, particularly in the United States, but there seems no agreement as yet on the real state of affairs. Mr. Jesse Jones, Secretary of Commerce, prophesying an output of 400,000 tons per annum after 18 months, is among the more optimistic of the authorities who have spoken; trade executives are less so, at any rate as regards the time limit. Still, as the New York *Rubber Age* says in a recent leading article, "the United States has never failed to meet any drastic emergency"; and the maintenance of that attitude is far more valuable than speculation on future output, whether optimistic or pessimistic. At any rate, America seems resolved to speed to the utmost the wheels of the synthetic rubber industry; petroleum officials have given assurance that all the requisite butadiene will be forthcoming, and arrangements for the manufacture of styrene are well under way. So it may be that Mr. Jones's estimate need not be so wild as some people think.

Cellulose Fodder

Swedish War-Time Research

STIMULATED by the practical problems arising from the war situation, much interesting research work is going on at various Swedish institutions. To a large extent the food situation has been saved by the industrial chemists and the engineers. For instance, fodder cellulose produced by the chemical pulp mills has become a very important substitute fodder for cattle. It has rendered possible a considerable reduction in the slaughtering of cattle which has been necessary owing to the difficulty in obtaining feeding stuffs from abroad and the poor harvests of the last two years.

The weakness of cellulose as a fodder is that it is practically pure carbohydrate and lacks albumen and salts. It cannot therefore be served in large quantities without additions of certain other substances. Natural feeding stuffs being scarce, experiments have been made in mixing the fodder cellulose with another product from the pulp mills—fodder yeast. It is now stated that the tests have been successful, and that production on a large scale will soon begin. At present one factory, belonging to the Swedish Pulp Company, is producing this material, but production will soon start at other mills.

In the production of fodder cellulose the boiling is continued much longer than in making paper-stock pulp and the like. In this way increased quantities of spirit can be recovered from the waste liquor, which, in addition, gives yeast as a by-product, yeast fungi being necessary in fermenting the sugar in the liquor. Even with a total recovery of such yeast, only a small part of the normal imports of cattle feed can be satisfied, but owing to its high albumen content—about 50 per cent.—it is, nevertheless, of great value. Besides, fodder yeast is valuable for other purposes as it contains a good deal of vitamins, especially B2, which is of great importance for prompting growth and is therefore suitable for young animals. Experiments also point to other useful though so far imperfectly understood ingredients. For fermenting sugar in the sulphite lye certain salts must be added as food for the fungi. These salts contain nitrogen and phosphoric acid, which make the yeast product all the more valuable as fodder.

The yeast is sold in the market dry, which means that the fungi are dead, but it can also be given the animals in wet state. This yeast may also be refined for human consumption—theoretically it could serve as a substitute for meat—but so far there has been no need to adopt such extreme measures. Hitherto this product, which has now been found of considerable value, was allowed to run off with the waste liquor.

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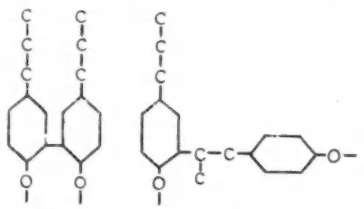
Developments in Lignin Chemistry, II

The "Architecture" of Lignin

(*Continued from The Chemical Age, May 2, 1942, p. 232*)

WE have now moved far ahead in the world of theoretical chemistry. It must be said that these biosynthetic speculations by Freudenberg do not in any way serve as proof of his theory about the structure of lignin; they have, however, contributed greatly to this subject. It is far more interesting to establish that, as Hibbert indicated, structures such as those postulated by Freudenberg do, in fact, exist in Nature and, above all, that they accompany lignin. It is, moreover, of great interest to look further into the manner in which Nature herself combines such phenylpropanes to form products simpler than lignin. We are amply provided by Nature with these examples and the study of the "architecture" and reactions of these compounds is an indication of the manner in which one can imagine lignin to be constructed, and thereby facilitate the formation of working hypotheses for experimental tests. In Nature there are also found, more faintly outlined, forms of the simple phenylpropane units, and they are all, as far as is known, bound together in one of the three following formulæ (XII, XIII, XIV).



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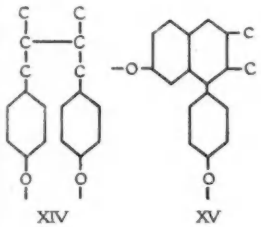
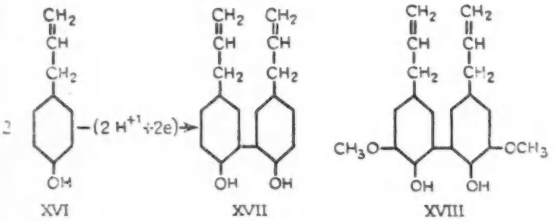


XIV XV

Formula XV *is a cyclised form of* XIV

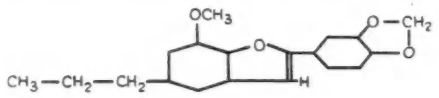
According to Formula XII magnolol (XVII)—besides many more complicated systems is formed. This magnolol may be formed through a dehydration of chavicol (XVI), equivalent to the enzymatic dehydration of eugenol—via ferric chloride—to form dehydrodieugenol (XVIII).



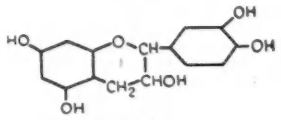
XVI XVII XVIII

Formula XIII is represented in the newly discovered egonol (XIX) which undoubtedly is built up of one phenylpropane and one phenylethane unit. It is, however, not unlikely that the phenylethane is a break-down product of a primary phenylpropane unit. Of the known products of Nature, egonol comes nearest to Freudenberg's lignin formula, particularly to Formula XI.

It is important to affirm that where condensation is not brought about by direct union between nuclei it is always the middle carbon atom in the side chain which is the connecting atom. Condensation of the units of phenylpropane in Freudenberg's lignin formula is likewise effected by this carbon atom. Formula X, however, is for the moment without analogy among the more simple products of Nature, unless we go to the extent of comparing it with substances like catechin (XX), flavone, and anthocyanin.

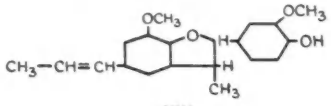


XIX

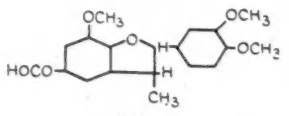


XX

These are, however, built up of only one unit of phenylpropane which is condensed with a phenolic nucleus. It thus appears characteristic of Nature's own technique of combining phenylpropane derivatives that, as far as the side chains are concerned, the middle carbon atom is the operative one. The substance XXII has been particularly closely studied. It is derived by methylation of dehydrodi-*iso*eugenol (XXI) followed by careful oxidation. This substance is known in lignin chemistry, on Freudenberg's suggestion, as Erdtman's Acid.

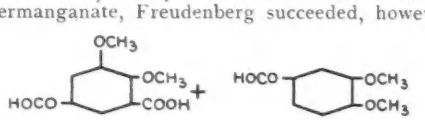


XXI



XXII

If lignin has a structure similar to dehydrodi*iso*eugenol then it should be possible, through hydrolytic opening of the "acid-bridge" in the lignin and methylation of the phenolic hydroxyl group, thereby liberated to obtain products, which by oxidation with potassium permanganate should give *iso*hemipinic acid (XXIII). A hydrolysis of an "oxygen bridge" of a fixed form, however, usually demands drastic conditions. Acids or similar reagents, for instance $AlBr_3$, should without doubt bring about a thorough change of the molecule—in fact a "resinification." Through treatment of isolated fir lignin, or still better, fir-wood, with strong caustic potash (70 per cent. at 170°), followed by methylation and oxidation with potassium permanganate, Freudenberg succeeded, however, in

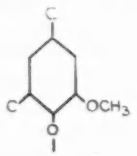


XXIII XXIV

breaking down lignin to the expected acids, *iso*hemipinic acid (XXIII) and veratric acid (XXIV). It is of interest that no *meta*hemipinic acid (4:5-dimethoxyphthalic acid) is isolated (*see* above, with the mixed ethers and their intramolecular condensation products). The reaction series is best illustrated by experiments with the acid XXII.

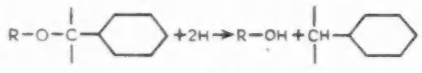
From lignin there is obtained 20 per cent. of veratric

acid, up to 12 per cent. of *iso*hemipinic acid, and traces of gallic acid trimethylether. The last-named acid is derived from syringyl groups and is obtained, as may be expected, in greater yield from beechwood lignin (7.5 per cent.). Drastic alkali treatment, however, introduces a great deal of uncertainty, and it is impossible to avoid the idea that much of the *iso*hemipinic acid which is isolated owes its existence to secondary condensation between nuclei and side-chains. Freudenberg has also been reduced recently to assuming that "half or more" of the lignin units in fir-wood are of type XXV.

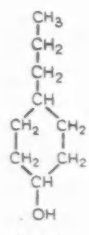


XXV

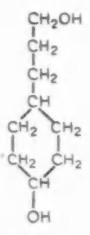
That many uncondensed units are part of the lignin is also indicated by the well-known formation of vanillin which takes place if isolated lignin, or still better, sawdust, is oxidised with nitrobenzol in alkali (2*n*NaOH) under pressure (160°). In this way there is obtained up to 25 per cent. of vanillin, besides some vanillic acid and vanilloyl carboxylic acid (*vanillin karbonsyra*). Oxidation of maple wood gives still greater yields of vanillin and syringic aldehyde, amounting to about 43 per cent. In a like manner vanillin is derived through oxidation with oxygen in the presence of various metal oxides, the best being cobalt oxide. The percentage of vanillin obtained here is about 10 to 14. The yields are so high that one can hardly believe that one is only dealing with division of terminal vanillyl groups. This might, on the other hand, be the case if methylated lignin were oxidised with potassium permanganate, as by this means only 1-2 per cent. of veratric acid is obtained. If ethylated lignin is oxidised the result is ethyl vanillic acid. If Freudenberg's formulæ are in the main correct, then hydrogenation of lignin ought to lead to the opening of the heterocyclic rings and, as no condensation of the heterocyclic system occurs, the molecule is split at the ether-oxygen atoms. It is, in fact, a generic reaction that combinations of the type: RO—C—C_6H_5 are split through catalytic hydrogenation into phenol and toluol derivatives (XXVI).



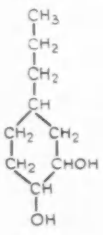
XXVI



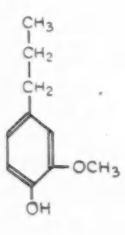
XXVII



XXVIII



XXIX



XXX

All Freudenberg's various lignin formulæ can now easily be recognised as more or less complicated benzyl-ethers. Obviously stimulated by this feature in Freudenberg's formulæ, a number of investigators have examined the feasibility of the hydrogenation of lignin and its derivatives, and the results are as valuable from the standpoint of pure lignin chemistry as from that of its technical utilisation. Harris, D'Ianni, and Adkins discovered that when certain lignin fractions isolated from poplar wood by means of methanol and hydrochloric acid were hydrogenated under pressure and high temperature (260°) in the presence of a copper-chromite catalyst, particularly high percentage yields of substances XXVII, XXVIII, and XXIX were obtained.

Godard, McCarthy, and Hibbert subjected sawdust to the same treatment and obtained similar reaction products, the yields of which reached 35-40 per cent. for fir wood and up to 70 per cent. for maple wood. Hachihama, Zyodai, and Umezu hydrogenated lignin in the presence of weaker catalysts, notably nickel, and obtained, in an approximately 50 per cent. yield, ether—soluble oils containing aromatic phenolic substances, including pyrocatechin and propylguaiacol; dihydrocugenol (XXX). Similar results were reported recently by Freudenberg, Lautsch, Piazola, and Scheffer, who extended the investigations to sulphite liquors. Freudenberg and Adam have lately developed another method which consists of the dry-distillation of isolated lignin under simultaneous hydrogenation in the presence of catalysts, which are either mixed with or directly precipitated on the lignin, *e.g.*, metallic nickel or chrome-copper combinations. By this means 20-50 per cent. of ether-soluble tar products are obtained, containing phenols and phenolic ethers.

Some of the most characteristic and technically important reactions of lignin remaining might briefly be described respectively as dissolution and digestion reactions. In its way, the simplest digestion reaction, but, as regards the result, the most complicated, and also the most incalculable, takes place when cooking wood in alkali. In accordance with present ideas of the constitution of lignin, the breaking-up of lignin by that process appears to depend on a splitting of ether linkages, *e.g.*, "bridges" of the types that enter into Formulæ XVI and XVII. Phenolic hydroxyls are thus formed, making the lignin soluble in alkali. The action of the alkali, however, inevitably, causes secondary condensations, as revealed by recently published experiments on the hydrogenation of alkali-lignins which give high-molecular hydrogenation products and only very little cyclohexanol derivatives of the C_6 series. (H. Adkins, R. L. Frank, and E. S. Bloom, *J. Am. Chem. Soc.*, 1941, *63*, 549).

(*To be concluded.*)

Preparation of Diazo Salts

Rapid Method with Good Yields

AN improved method for the preparation of benzene-diazonium salts has been reported by William Smith and C. E. Waring, of Brooklyn Polytechnic Institute (*J. Am. Chem. Soc.*, 1942, *64*, 2, p. 769). The method outlined avoids the disadvantages of the usual method originally propounded by Hantzch and Jochem in 1901 (*Ber.*, *34*, 3337) and analogous methods. Not only are these methods tedious and time-consuming, but also it not infrequently happens that an oil, instead of a crystalline precipitate, is produced. Further, the yields obtained by these methods are rather poor.

The following method has been found to be rapid (fifteen to thirty minutes), to produce good crystalline precipitates, and to give yields approaching the theoretical.

Five grams of aniline hydrochloride are suspended in a mixture of 30 ml. of glacial acetic acid and 30 ml. of anhydrous peroxide-free dioxane. The mixture is cooled in an ice-salt bath and ethyl nitrite is bubbled in until all the solid material is dissolved. It has been previously established that the complete diazotisation of the hydrochloride coincides with the disappearance of the solid phase and the first appearance of an excess of ethyl nitrite. Hence, the instantaneous coloration of starch iodide paper produced by a drop of the solution gives evidence that diazotisation is complete. Dry dioxane (150 ml.) at room temperature is then added in one portion to the completely diazotised solution, and benzenediazonium chloride immediately precipitates in a fine, white crystalline form. The solid is filtered on a Büchner funnel and washed twice with two 25-cc. portions of dry dioxane to remove any last traces of acetic acid. The yield of dry benzenediazonium chloride from seven different preparations was, in all cases, calculated to be better than 95 per cent. of the theoretical.

The salt may be kept in good condition for at least a month by merely placing it in a stoppered bottle, at room temperature, under dry dioxane. Any decomposition products formed under these conditions are readily soluble in the dioxane.

The method described has been found equally successful with benzene-diazonium sulphate. It is reasonable to assume that this method should give equally good yields of high purity for diazo salts from all acids.

British Association of Chemists' Meeting

London Section Chairman's Address

THE 24th annual meeting of the London Section of the British Association of Chemists was held at the Café Royal, London, W.1, on May 2. The report of the committee for the year 1941-2 showed that membership had increased slightly. The report referred to the appointment of a sub-committee by the Council of the Association to report on propaganda as a means of increasing the membership. As regards affiliation to the Trades Union Council, the committee have not come to a decision.

The meeting unanimously re-elected Mr. W. C. Peck, M.Sc., A.I.C., M.I.Chem.E., Technical Director, Apex Construction, Ltd., as chairman for a further year. Miss Wright and Mr. Littlejohn retired as hon. secretaries and did not seek re-election, and Mr. Stewart Cook was elected hon. secretary. Mr. W. Littlejohn was elected hon. treasurer in place of Mr. H. Langwell, who also did not seek re-election. The following were elected to the committee: Messrs. A. J. Baker, W. E. Callingham, Dr. J. G. Fife, Dr. G. W. Himus, Messrs. T. W. Jones, T. McLachlan, F. D. Neech, F. W. Stoyle, Dr. E. Sunderland, Messrs. J. L. Sweeten, F. P. Walton, and Miss W. Wright.

Increased Subscription Recommended

A long discussion took place upon a resolution, submitted with the concurrence of the London Committee, recommending the Council to increase the subscription to the Association, the view being that lack of funds was seriously handicapping the activities and expansion of the Association. For the most part there was agreement with the proposal, and the resolution was passed. This same question was raised later when it was complained that the Association was rather looked upon in certain quarters only from the point of view of its Unemployment Fund. A more vigorous policy having been urged, the President (Dr. A. E. Dunstan) assured the meeting that the Council was actively concerned in discussing future policy and added that a number of committees were working on post-war planning. He himself favoured immediate action in various directions. Other criticisms were to the effect that other chemical bodies were able to offer their members a great deal more than did the Association, but the answer to this was that lack of funds was the cause. A widening of the scope of the work of the Association on the technical side was urged, and the definite suggestion was made that the Association should become more a scientific society than it was at present, and that there should be less of the "friendly society" about its policy.

A New Type of Address

The Chairman (Mr. W. C. Peck) having reinforced the President's statement that the Association's future policy would be along the lines indicated, announced that his address would be of a type new to the Association. Previous addresses had usually dealt with the preceding year's work of the section, but this year he was going to attempt to give them some thoughts on the chemist in his relation to the social structure at the present time, to suggest some of his responsibilities, and point out some of his opportunities in the future.

Improvement in the professional structure of chemistry, Mr. Peck went on to say, is in the minds of many chemists to-day, and among the suggestions put forward to attain this end there appear to be three quite distinct and definite proposals: (1) To federate all the existing associations and societies in Great Britain under one main body; (2) to organise a real profession of chemistry to include all chemists from the most important down to the youngest laboratory assistant; (3) to create a closed and properly recruited and highly remunerative professional organisation of trained persons, so that they shall receive a fair and reasonable reward for their services.

Some movement along the lines of the first proposal has already been taken under the General Chemical Council, while the second and third proposals both concern the organisation of a profession of chemistry, but differ in their conception of the profession. The second proposal includes persons other than those qualified, while the third would include only those who have attained a definite standard of qualification. Industry recruits chemists by two main methods, one by engaging persons who have passed through a course of training and examination in science, the other method by engaging young persons at about the age of sixteen as laboratory assistants, mainly from the secondary schools. The greater proportion of these last attain positions as chemists. Their advancement is regular, and that is why no separate organisation for laboratory assistants has been successful, as the position of a laboratory assistant is generally only a temporary or transitional one. At present there can be no control of this method of entry, the entry being a two-party arrangement satisfactory to both parties.

Recognition of "Untrained" Chemists

To-day, the Central Register has established a definite grade of such persons, those with training up to Higher Schools Certificate or Intermediate Science with five years' practical experience, and this is the first definite recognition of a group of persons who have entered the profession other than by academic and professional examination. There is much to be said for an extension of the membership of the Association to allow these persons, from the youngest upwards, to fit more definitely into the structure of the Association.

The third proposal, that of creating a closed, properly recruited and highly remunerative professional organisation, is usually put forward with references to the so-called "closed" professions of Medicine and Law, each of which, however, is in much more direct contact with the general public than the chemical profession. A "closed" profession can be established only if it is conceded that the attainment of specific qualifications for all its members is in the interest both of the individual members and of the community served. Only in certain specialised operations in chemistry have these two conditions been established, *e.g.*, in the appointment of Public Analysts, and in the control of the production of poisons under the Pharmacy Act.

The Scientist's Responsibility

Whether such a proposal, which in effect aims at controlling "chemical intelligence" as a marketable commodity, is desirable at the present time is questionable. An attempt to force it on the community, who have not conceded its justification, would be sacrificing the interests of the community to the sectional interest of the chemists, and in the long run would be disastrous to the profession. This type of proposal was typical of the democracies before the war. During those years, as I pointed out out in THE CHEMICAL AGE of 1939, it was the "rights" of persons and classes that were stressed unduly and their "obligations" and "responsibilities" were neglected. In my view it would be unwise to stress this proposal at the present time. To-day, every scientific society and its members have a responsibility to insist on and assist in the utilisation of science for the war effort, and for the period of reconstruction after the war. The improper use or neglect of science is one of the causes of the present disastrous world situation.

The Chairman continued with an eloquent and forcible plea for understanding on the part of chemists, and of scientists generally, of the part they must play in the life of the world. A scientific civilisation, to be a good civilisation, should be accompanied by an increase in wisdom. He concluded with the words of the late Professor A. G. Green: "It is not so much the education of our chemists which is at fault as the scientific education of the public as a whole."

The Association of Tar Distillers

Points from the Annual Report

THE year ended December 31, 1941, saw a sharply increased demand for practically all tar products, directly from the war industries, and indirectly for replacement, chiefly as fuels, of imported petroleum products. When the demand for any product has exceeded potential supply the Coal Tar Controller has taken action designed to ensure the direction of supplies into essential channels. In this work he has maintained close liaison with representatives of the industry through his Advisory Committee and otherwise. Although chiefly concerned with the proper representation of the industry's views to, and co-operation with, the Coal Tar Controller, the Association has continued to maintain close and friendly relations with the various Government Departments and the other associations and bodies with which it deals.

Early in the year Col. W. A. Bristow was elected President of the Association. At his suggestion a reconstituted Executive Committee was formed consisting of those members of the association who were members of the Controller's Advisory Committee.

At the same time a Tar Trade Liquid Fuel Committee was also elected, substantially on a regional basis, to deal with the many aspects of the supply of tar fuels to the Petroleum Board and, in the case of pitch, direct to consumers. A technical sub-committee also resulted from the activities of the Tar Trade Liquid Fuel Committee.

Towards the end of the year the Controller asked for the appointment of a National Creosote Committee to co-operate with him in matters relating to the production, allocation and distribution of creosote and coal tar fuels. After joint meetings with the bodies concerned the National Creosote Committee was formed of the personnel of the Tar Trade Liquid Fuel Committee, and the functions of the Hydrogenation Committee and of the Commercial Creosote Committee were taken over by the new committee.

A small *ad hoc* committee, representative of the various marketed grades of naphthalene, was formed in May, and the Controller has subsequently stated that he regards this committee as his advisory committee on naphthalene. It has assisted him in the formulation and subsequent revision of the price control Order on naphthalene, and is a focal point of co-operation between the makers of crude and refined naphthalene. Tar acids, being in very strong demand for vital needs, have presented difficult and successive problems. Phenol as a finished product has been successfully dealt with by the makers with whom the Controller has negotiated direct, but the remaining acids—crude and refined—were first considered within the Association by a specially appointed sub-committee.

Supply of Tar Products

Tar fuels, to the three grades specified, were supplied on an ever increasing scale during the year to the Petroleum Board. Steadily rising production costs led to securing the Coal Tar Controller's support in obtaining a better costs price for creosote fuel oil, though the price of creosote/pitch mixture remained unchanged. As the consumption of mixture was increasing considerably in the absolute and in relation to consumption of creosote, this improvement could not prove permanently significant.

The total absence of the export market caused a surplus production of pitch which constituted a very acute problem in some areas. After considerable deliberation on the part of the Mines Department, it was eventually made clear that the individual producers were free to make a direct approach to potential consumers of pitch as a fuel. Partly by replacing oil and partly by replacing coal, the pitch problem has been solved or considerably eased in some regions, although at the same time the shortage of labour was making it difficult to use up the vast stocks that had been accumulated in the beds. In some cases, accumulation of pitch stocks is still a real problem.

One of the first actions of the Coal Tar Controller was to place a ban on the export of tar acids containing more than 2 per cent. of phenol, with a corresponding limit on creosote. These restrictions were later extended to all crudes not going to refineries for phenol extraction. The Controller has throughout been very helpful in taking special circumstances into consideration when applying the restrictions, and done everything possible to stimulate phenol production by directing crudes to refineries with surplus capacity. Cresylic acid came into very strong demand during the year, particularly from the U.S.A. Any scheme for crude acid prices had to be related to cresylic acid prices, and this material was, at the end of the year, still being considered by the Controller in connection with the price control Order on all tar acids, which has since been promulgated.

Agreement was reached early in the year for the funding of naphthalene exports to the U.S.A. by means of a levy collected from producers, but it was subsequently found that sales would be arranged at a level that would not necessitate the collection of the levy.

At the urgent request of the Coal Tar Controller, large quantities of hot-pressed and high-grade whizzed naphthalene were supplied during the year to meet essential home requirements. This drive was watched over by the *ad hoc* naphthalene committee previously mentioned. Towards the end of the year, the heavy demand for naphthalene caused prices to rocket in the fire-lighter trade and material to be diverted into less essential channels. The Coal Tar Controller dealt with this situation by the introduction of a direction in regard to disposals, and a price control Order which fixed the prices of all grades of naphthalene.

Standardisation

To meet the special conditions resulting from the Controller's limitation of phenol content in export oils, two special tests were prepared by the Standardisation of Tar Products Test Committee. These were printed and circulated as addenda, under the heading "Special Wartime Tests," to the second edition of "Standard Methods of Testing Tar and its Products."

In so far as it related to containers for tar and tar products, the work of the British Standards Institution in standardisation of iron and steel containers—primarily with a view to the maximum economy in the consumption of iron and steel—has been fully related to members' interests, by full consultation with the industry.

A carefully documented case was prepared and submitted to the Factory Department for the exclusion of crude tar from the provisions of Defence Regulation 36. The general case was not accepted, but an assurance was given that individual cases would be given sympathetic consideration.

Export trade was increasingly restricted during the year. Cresylic acid and some naphthalene went to the U.S.A., while occasional parcels of refined naphthalene went to other countries early in the year. Certain quantities of creosote were allowed to be exported to the U.S.A. for essential war purposes and the industry regrets that home requirements for the war effort prevented larger quantities being sent to America.

Owing to the difficulties of procuring chemical products for which there is a demand, chemists in Turkey have created a limited company whose object is to import all products of which they are in need. The company will make its purchases direct from factories, either foreign or local. The capital of the company is fixed at £T 300,000, of which 25 per cent. has been subscribed, and 107 chemists are already members of the company. Shares are in units of £T 100, and can only be sold to the company itself. The company started operations at the beginning of this year. Its statutes have been approved by the Government.

The Continental Cell-Wool Industry

Recovery of Chemical Products

WITH an annual consumption of 400,000 tons of sulphuric acid and 300,000 tons of caustic soda the cell-wool industry is one of the largest consumers of heavy chemicals in Germany, where artificial fibres are now said to account for 60 per cent. of all textile supplies. Cell-wool factories are also being built or operating in most other countries of the Continent. Sweden will soon produce 18,000 tons of cell-wool, Norway 9500 tons, Finland 2000 tons, Holland 8000 tons, Belgium 17,000 tons, France 21,000 tons, Spain 12,000 tons, Switzerland 9000 tons, Slovakia 7000 tons, Hungary 3000 tons, and Rumania 6000 tons per annum. Production on this scale must, of course, create difficult problems in the supply of raw materials. To produce sufficient cellulose, the Dutch and Spanish factories will draw upon straw as a raw material, while in France reeds and broom are being tested in an experimental plant. In Germany other waste plant products, such as potato-tops, have been studied with a view to the broadening of the raw-material basis.

On the chemical side savings are expected from new recovery processes. The waste Glauber's salt, of which about 300,000 tons annually are obtained in the spinning baths of German cell-wool factories alone, will be subjected to continuous electrolytic decomposition to yield sulphuric acid and caustic soda lye. It is said that there is an economic process which can be carried out in apparatus of modern design for at least partial recovery of the two chemicals in sufficiently high concentration and purity. The recovery of carbon disulphide, of which 140,000 tons per annum are used in the German cell-wool industry, is said to have made some progress. The carbon disulphide escaping from the spinning bath is drawn off directly, while that part of it which adheres to the cell-wool is recovered by steam distillation followed by condensation. Over 40 per cent. of the carbon disulphide used is thus saved, a reduction in the consumption of sulphur (mostly imported) by about 60,000 tons per annum.

Noxious Waste Disposal

Great trouble has been caused by the large quantities of poisonous and malodorous waste gases accumulating in the factories. The quantities are too large to direct them simply through high chimneys into the atmosphere. Recovery in absorption towers is too expensive, as the sodium sulphide obtained has no useful outlet. Oxidation with ozone or chlorine is also too expensive; besides, the evil smell is not completely removed. At present the waste gases are usually carried by ventilators through earthenware pipes to the boiler plant where the sulphur content is burned to sulphur dioxide, without, it is claimed, damaging the boiler tubes. A similar problem is that of the waste liquors which are so voluminous that they cannot be allowed to flow into adjoining rivers.

The hemicelluloses, more sensitive than cellulose to acids and alkalis, must be largely eliminated to avoid deterioration of the fibre. Hitherto they were removed in the course of alkalisation, but now they are eliminated by preparatory hydrolysis, *i.e.*, treatment of the raw material by weak acid under pressure, which yields a better grade of cellulose for cell-wool manufacture. The hemicelluloses contain xylose, mannose, galactose, and glucose; xylose is obtained from straw and hardwood trees, while softwoods yield about 50 per cent. mannose. Furfurol for the lacquer and plastics industry can be produced from xylose, but more interest attaches to the manufacture of yeast and protein products. Pentosans obtained by hydrolysis of wood are carefully purified and, after addition of phosphates and ammonium salts, yield on fermentation with *Torula utilis* in a strong air current a yeast rich in vitamin B. One cell-wool factory alone could produce 20,000 tons of yeast with 10,000 tons of protein. Compared with other processes for protein synthesis from cellulose-containing materials after hydrolysis, this method is said to be distinguished by mild operating conditions resulting in only partial saccharification and leaving the cellulose unaffected so that it can be used for other purposes.

No information, however, is given on the economic side of any of these new processes. In so far as the aim is the removal of dangerous and useless gases, the usual economic considerations do not, of course, apply, but even where recovery of otherwise useless products is the object of new processes, the lack of economic information suggests that their commercial value is still to be proved. No doubt great progress has been made in the utilisation of new raw materials, in the recovery of chemical agents used in manufacture, and in the application to other uses of waste products, but it is still questionable how the cell-wool industry will stand after the war. Its future will depend primarily on the merits of its main product. A few weeks ago one of the leading producers announced the development of a new type of cell-wool of a more wool-like character. The older types, at any rate, have failed to live up to the great promises made for them, and if, nevertheless, all Continental countries are now compelled to apply the German (and Italian) processes it is because of the lack of natural fibres.

Oil and Colour Problems in War

Technical Advisory Council Formed

THE Oil and Colour Chemists' Association announces the formation of a Technical Advisory Council with the object of assisting Government Departments. In this they are utilising the high technical skill and industrial experience of their members in the large number of applications of chemistry with which they are concerned. They are in fact implementing to the highest degree the co-operative idea with which the Association was originally formed.

A letter, addressed to Government and Service Departments, has been sent out by Mr. H. Clayton, Hon. Organising Secretary of the Technical Advisory Council, outlining the objects of that body. "It is the aim of the Council," the letter states, "with the assistance of special panels, to render any service within its power, in regard to such matters and problems as may be referred to it. . . . There is no doubt that the present stringency of supply of so many raw materials requires the earnest consideration of all competent persons. The fluctuations in the supply of key raw materials, and of substitutes therefor, and the ever-present anxiety of manufacturers to reconcile the quality of their output with specification limits call for a ceaseless examination of the technique of manufacture. With substitution is linked the conservation of materials and that in turn means that direction is certain to be required in respect of formulations, having regard to the use to which the product is to be put and to the minimal performance requirements to secure the desired end. . . . The Council does not envisage the carrying out of research work, but on certain questions its advice as to the nature and extent of investigation work likely to be profitable might be acceptable."

Technical Departments of Ministries or Services will no doubt welcome this opportunity of collaborating with a highly competent technical advisory body. Inquiries should be addressed to Mr. Clayton at Chestnut Close, Kingswood, Surrey.

The United States fluorspar industry was called upon to supply an unprecedented demand in 1941 to meet the requirements of steel mills and aluminium plants, and the greatly accelerated needs of manufacturers of glass, enamel, and hydrofluoric acid, according to final 1941 figures of the Bureau of Mines.

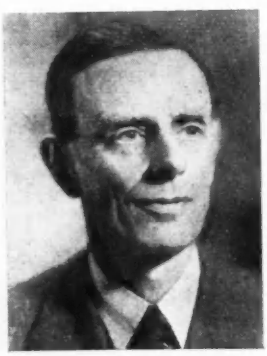
Personal Notes

MISS W. WRIGHT, vice-president and chairman of the Unemployment Special Purposes Committee of the B.A.C., and MR. C. B. WOODLEY, general secretary of the Association, are attending the annual meeting of the Notts and Derby Section at the Midland Hotel, Derby, this evening. DR. A. E. DUNSTAN, President, is delivering an address on "The Chemist in the Petroleum Industry."

MR. HUGH N. LINSTEAD, secretary of the Pharmaceutical Society of Great Britain, has been chosen as National Government candidate for Parliament in the Putney bye-election, polling at which will be going on while these pages are in the press. MR. A. J. F. MACDONALD, secretary of the Paint Export Group, was selected by the Conservative party as their candidate, but withdrew from the contest for personal reasons.

DR. ARNO CARL FIELDNER, head of the Technologic Branch of the Bureau of Mines, Washington, U.S.A., has been awarded the Melchett Medal for 1942, by the unanimous decision of the Council of the Institute of Fuel, on account of the great service to industry of the work carried out by him and under his supervision in connection with fuel. It is hoped that the MS. of his Melchett lecture will be received in London in time for it to be available for presentation at a special meeting of the Institute next October.

The following appointments have been made by the Committee of the Plastics Group of the Society of Chemical Industry: MR. E. G. COUZENS, chairman; MR. A. J. GIBSON, vice-chairman and hon. treasurer; DR. S. H. BELL, hon. recorder; MR. N J. L. MEGSON, hon. secretary: DR. J. HETHERINGTON and MR. AUSTIN LOWE, members of Committee. DR. G. S. WHITBY, retiring chairman, becomes *ex officio* a member a member of Committee. DR. W. BLAKEY and MR. J. IDRIS JONES have been nominated to fill the two remaining vacancies for Committee members and will be elected at the Annual Meeting on May 12. MR. C. F. GRIFFITH, DR. L. A. JORDAN, and MR. FOSTER SPROXTON retire from membership of Committee.



Mr. E. G. Couzens

New Control Orders

Export Licensing

UNDER the Export of Goods (Control) (No. 21) Order, 1942 (S.R. & O. 1942, No. 769) which comes into force on May 19, licences will, in future, be required to export to all destinations: iron powder; tanks of the kinds used for the storage of oil or water; potassium antimony tartrate; and sodium antimony tartrate.

The existing control in respect of certain specified articles manufactured wholly or mainly of aluminium or its alloys is extended to cover all articles containing more than 10 per cent. by weight of aluminium or its alloys, but applications for licences to export these goods will not, normally, be entertained.

The existing licensing requirements with respect to (a) barium carbonate, barium nitrate, and barium sulphate, including blanc fixe, and (b) chromium compounds and preparations are superseded by the provisions that licences will, in future, be required to export the following: barium compounds; chromium compounds and preparations (except distempers, lacquers, varnishes, paints and painters' enamels, prepared or ready mixed).

The following classes of goods, the export of which was previously prohibited to certain specified destinations will, in future, require licences (as chromium compounds and preparations) to export to all destinations: barium chromate and pigments containing barium chromate; pigments containing lead chromate; zinc chromates and pigments containing zinc chromate.

Licensing Area Extended

Under the Export of Goods (Control) (No. 22) Order, 1942 (S.R. & O. 1942, No. 783), which also comes into force on May 19, licences will be required to export goods of every description to Spain (including the Canary Islands and the Spanish Zone of Morocco), Portugal (including Madeira, the Azores and the Cape Verde Islands), Turkey (including the Hatay), Iraq, Tangier Zone, Liberia, Portuguese Guinea, Andorra, Rio de Oro, and any port or destination in the U.S.S.R. Under this Order, all destinations classified "C" will be transferred to the list of destinations to which the export of all goods is controlled and all items in the schedule of controlled goods against which the letter "C" appears should accordingly be deleted.

Starch made from Wheat

Under Article 2(a) of the Starch and Dextrine (Control) Order 1941 (S.R. & O. 1941, No. 1991), the use of sago flour, tapioca flour, or tapioca dextrine is prohibited except under licence. The Minister of Food has now made an Order, which came into force on May 1, adding wheat products to the list of prohibited commodities from which starch may be prepared (S.R. & O. 1942, No. 788).

British Chemical Prices

Market Reports

A STEADY trade is reported from most sections of the industrial chemical market this week, and deliveries to consumers against existing contracts have covered good volumes and the position is regarded as satisfactory. A little more export activity has been noticeable in some directions chiefly as a result of the recent modifications of the licensing restrictions. The soda products generally are an active market with chlorate of soda in short supply, while a good demand is in evidence for caustic soda and bicarbonate of soda. Quotations for yellow prussiate of soda are very firm. In the potash section, permanganate of potash, bichromate of potash and caustic potash are in strong demand, while yellow prussiate of potash continues scarce with quotations more or less nominal. In other directions formaldehyde is a good market and arsenic, borax, and crude and refined glycerine remain steady and firm. Barium chloride is in good demand. In the coal-tar products market the chief feature has been the issue of maximum prices for tar acids under the Coal-Tar Control. The market is now giving attention to the accumulation of orders for cresylic acid, the export trade of which is not included in the scope of the Order. Revised prices for naphthalene, recorded last week, are now in operation. In other directions pyridine is reported to be firmer, whilst some improvement is noted in the home demand for pitch.

MANCHESTER.—Quotations have been well maintained in all sections of the Manchester chemical market during the past week. The general run of soda products is being taken up steadily, with bichromate, chlorate, and yellow prussiate the least satisfactory from the point of view of supplies. There is plenty of inquiry also for the potash compounds, though the supply position of these is no easier. A fair trade is reported in hydrochloric acid, and sulphuric and oxalic acids are readily absorbed as offers are made. The by-products are firm for the most part and in steady demand.

GLASGOW.—Business in the Scottish heavy chemical trade has been quiet during the past week both for home and export trades. Prices generally continue very firm at previous figures.

Price Changes

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Cresylic Acid.—MANCHESTER: Pale, 99/100%, 4s. 6d. per gal.

Methyl Acetone.—40/50%, £56 per ton.

Naphtha.—MANCHESTER: 90/160°, 2s. 2d. to 2s. 7d. per gal.

Wood Naphtha.—Miscible, 4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. per gal.

Wood Tar.—£5 per ton.

Xylol.—MANCHESTER: 2s. 9d. to 3s. 2d. per gal.

General News

The Ministry of Agriculture is prepared to supply farmers with straw pulp plants, delivered and erected free of charge, where the installation of such plants is considered desirable and practicable.

The Ministry of Food announces that there will be no change in the existing prices of oils and fats allocated to primary wholesalers and large trade users for the four weeks ending May 30.

The forthcoming appointment of a special scientific adviser to the Army Council was announced in the House of Commons by Sir James Grigg last Tuesday. It was promised that a further announcement on the subject would be made shortly.

The total membership of the Plastics Group, Society of Chemical Industry, up to April 25, was 382, the increase since March 20, 1941, reaching the high figure of 69. The implication appears to be that the importance of plastics is being actively realised to an increasing extent.

The following have been elected Fellows of the Institute of Physics: S. Denfield, B.Sc., A.R.C.S., M. Francis, B.Sc., Ph.D.; W. R. Lane, B.Sc., H. Miller, M.Sc., Ph.D., J. L. Miller, D.Eng., Ph.D., A. Shallamach, Dipl.Ing., and K. E. Spells, B.Sc., Ph.D. Nineteen associates have also been elected, and 22 subscribers and twenty students admitted.

The Trading with the Enemy (Specified Persons) (Amendment) (No. 7) Order, 1942 (S.R. & O. 1942, No. 750) contains the names of about 350 persons and firms in neutral countries, with whom trading of any kind is illegal. It includes the S.A. "P.A.L.M.A." (Proveedora de Articulos para Laboratorio y Material de Analisis), Humboldt 42, Mexico City.

Wax polishes, creams, and dressings for floors, furniture and shoes, are among the classes of goods the supply of which will be controlled from June 1. The supply by manufacturers of these goods, in the manufacture of which they have carried out a process, will be restricted to a rate of 60 per cent. by value. The standard period will be the six months ended November 30, 1939.

Some misunderstanding has arisen regarding the recent announcement of the issue of an Order amending the Starch and Dextrine (Control) Order, 1941. The Ministry of Food wishes to make it clear that the new Order prohibits, except under licence, the use of starch made from wheat and wheat products. The use of wheat and wheat products themselves is already governed by other Statutory Rules and Orders.

Anyone who has tyres not required for immediate use and fit for substantial further service without being retreaded, is asked by the Ministry of Supply to offer them for sale to an authorised tyre depot or to a licensed retreader. Tyres suitable for retreading should be offered for sale to licensed retreaders only. Worn out or scrap tyres should be disposed of to dealers or certified waste rubber merchants or handed in to any local authority or garage.

Food Investigation Special Report No. 51, "The Composition of the Depot Fats of Aquatic Animals," by J. A. Lovern (H.M.S.O., 1s. 6d.), has just been issued by the Food Investigation Board of the D.S.I.R. The report deals with methods of analysis—fractional distillation, the determination of structure by oxidation, and the study of glyceride structure—with the compositions of fats for which quantitative data are available, and with the various theories concerning the means by which the animals have modified their depot fats.

The Women's Technical Service Register is a new appointments register just opened by the Ministry of Labour, to record the names of women with a mechanical or mathematical bent, for whom many opportunities are now occurring in the industrial field. Industrial chemistry proper does not figure in the list of trades cited in the official announcement, but there are openings in metallurgical works, and courses of training have been planned for suitable candidates. An information leaflet is available to trainees, and can be obtained at any Employment Exchange.

From Week to Week

Foreign News

The Chilean company, Mussla, Ltda., which manufactures insecticides for agriculture, is reported to have been bought and taken over by the Chilean branch of Imperial Chemical Industries, Ltd.

Barium nitrophthalate is being used in Germany as a paint for protection or ironwork against rust. It is claimed to give excellent results even in aqueous emulsions. The covering power, though normally moderate, can be increased by addition of suitable dyes or pigments.

Deposits of high-grade mica located in central Australia have now made it unnecessary to proceed further with plans for the production of synthetic ceramic insulators. It is also anticipated that this mica field will now make Australia independent of imports formerly obtained from Madagascar.

The United States is financing new construction work for developing the Itabira iron mines in Brazil. At the same time it is reported that the British Government is also a party to the agreement for the development of these mines, and that the British-owned Itabira Iron Ore Company is to be acquired by H.M. Treasury. The mineral reserves on the company's property in Minas Gereas are estimated at 500 million tons of high grade hematite ore, supplies of which, it is understood, will be made available to the U.S.A. and Great Britain.

The Nazi-controlled factory of the Société Anonyme des Produits Chimiques, at Tessenderloo, Belgium, about 30 miles N.E. of Brussels, will, according to reports from German sources, no longer require the attention of the R.A.F. An announcement states that the factory was entirely destroyed by an explosion on April 29, when 250 persons were killed and 1000 injured. The factory was engaged in producing sulphuric and hydrochloric acid, chlorine products, caustic potash, and other munitions of war.

Forthcoming Events

"Recent Developments in Metal Rectifiers as Applied to Electro-Deposition" is the title of a paper to be presented by Mr. D. Ashby, at a meeting of the London Section of the **Electrodepositors' Technical Society,** to be held at the Northampton Polytechnic, E.C.1, at 5.30 p.m., on **May 11.**

The Leeds Area Section of the **Chemical Society** will meet in the Chemistry Department of the University, at 7 p.m., on **May 12,** when Dr. W. H. Mills will deliver the eighth Pedler Lecture, entitled "Recent Progress in Stereochemistry."

"Chemical Engineering in the Laundry Industry" is the title of the paper to be presented by Mr. F. Courtney Harwood at the meeting of the **Institution of Chemical Engineers,** to be held in the Rooms of the Geological Society, Burlington House, W.1, at 2.30 p.m., on **May 12.**

The Plastics Group of the **Society of Chemical Industry** is holding a luncheon at Stewart's Restaurant, at 12.45 p.m. for 1 p.m., on **May 12,** to be followed by the annual general meeting of the Group at 2-2.30 p.m. After this, in the Rooms of the Chemical Society at Burlington House, W.1, there will be a meeting of the Group, when Mr. H. Courtney Bryson will speak on "Some Aspects of the Gramophone Record."

The nineteenth annual general meeting of the **British Chemical and Dyestuffs Traders' Association** will be held at the Great Eastern Hotel (Abercorn Rooms), London, E.C.2, at 2.30 p.m., on **May 13,** when the accounts and chairman's report for 1941 will be received and officers elected for 1942.

The thirty-second annual May lecture of the **Institute of Metals,** entitled "Water Power and Its Application to the Production of Metals," will be delivered by Mr. W. T. Halcrow, M.Inst.C.E., on **May 13,** at 6 p.m., in the Hall of the Institution of Mechanical Engineers, Storey's Gate, S.W.1.

The twenty-third annual general meeting of the Chemical Engineering Group of the **Society of Chemical Industry** will be held at the Waldorf Hotel, Aldwych, London, W.C.2, on **May 20,** at 12.30 p.m., preceded by a meeting of the general committee at 12 noon.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ASSOCIATED BRITISH CELLULOSE, LTD., Slough. (M., 9/5/42). April 13. Mortgage to Martins Bank, Ltd., securing all moneys due or to become due to the Bank; charged on contract moneys. *Nil. June 30, 1940.

DORMAN LONG & CO., LTD., Middlesbrough, iron and steel manufacturers, engineers, etc. (M., 9/5/42.) April 16. Mortgage supplemental to a Trust Deed dated January 31, 1936; charged on freehold and leasehold hereditaments and premises; also April 6. Mortgage supplemental to a Trust Deed dated July 26, 1923, etc.; charged on freehold and leasehold hereditaments and premises. *£4,108,508. December 11, 1941.

Company News

Associated Clay Industries announce a profit for 1941 of £9843 (£20,643 loss).

The Bede Metal and Chemical Co., Ltd., report net profit for 1941 of £5712 (£9804), and have declared a dividend of 9d. (1s.) per share, subject to tax.

Eucryl, Ltd., have declared a bonus of 6d. per share on the preferred ordinary stock and 7.15d. per share on the deferred ordinary, both free of tax.

African Explosives and Industries, Ltd., report a net profit for the year ended September 30, of £824,725 (£912,441), and have declared a final dividend of 5 per cent., making 30 per cent. (same), and a bonus of 2½ per cent. (7½ per cent.) for the year.

New Companies Registered

Phonetic Waxes, Ltd. (373,566).—Private company. Capital: £500 in 500 shares of £1 each. Manufacturing, research, dispensing and analytical chemists, manufacturers of and dealers in raw materials, plastics, synthetic products, industrial preparations, etc. Directors: W. H. White, G. B. Cuming. Registered office: Conway Avenue, Conway Street, Nottingham.

Witham Oil and Grease Company, Ltd. (373,551). Private company. Capital: £1000 in 1000 shares of £1 each. Oil blenders and manufacturers, refiners, importers, exporters and merchants of tallow, saponaceous compounds, grease, engine packings, etc. Directors: Albert E. Smith, Arthur E. Smith, both of 34 Richmond Road, Lincoln, Geo. R. Smith.

Spencer, Son and Partners, Ltd. (373,294).—Private company. Capital: £500 in 500 shares of £1 each. Manufacturers of and dealers in chemical products and essential oils and drugs, seed crushers, cake and oil manufacturers, soap boilers, fertiliser manufacturers, etc. Subscribers: Kathleen L. Pincott, Mary Wray. Solicitor: Jonas Lyons, 26 Martin Lane E.C.4.

Cobnar Wood Colliery Company, Ltd. (373,534).—Private company. Capital: £2500 in 2500 shares of £1 each. Manufacturers of and dealers in sulphate of ammonia, dyes, colours, and all substances and liquids which can be produced by the treatment of coal, etc. Directors: F. Wyatt, T. D. Eyre, W. Llewellyn. Registered office: Yorkshire Penny Bank Chambers, Irongate, Chesterfield, Derbyshire.

Mat-Val, Ltd. (373,707).—Private company. Capital, £1000 in 1000 shares of £1 each. Manufacturers, importers and exporters of oils, paints, varnishes, natural and synthetic plastics, and phenolic condensation products, dyers, sprayers and varnishers, manufacturers of and dealers in electrical, chemical, and scientific apparatus, etc. Subscribers: J. G. Hughes, L. A. Wright. Registered office: 74/5 Cheapside, E.C.2.

Rhondda Metal Co., Ltd. (373,593).—Private company. Capital, £500 in 500 shares of £1 each. Smelters, refiners, processors, roasters, grinders and warehousemen of non-ferrous metal, scrap, ores, residues and by-products, manufacturers of chemicals and chemical products, etc. Directors: O. E. Charlwood, E. W. Leighton. Registered office: 8 Talbot Mansions, Museum Street, W.C.1.

Thompson Fertilisers, Ltd. (373,272).—Private company. Capital: £4000 in 4000 shares of £1 each. Manufacturers of and dealers in fertilisers, chemicals, dyes, etc. Directors: Michael Thompson; John W. Thompson. Solicitors: Wray Smith and Halford, 19 Buckingham Street, W.C.2.

Solus Fire Extinguishers, Ltd. (373,548).—Private company. Capital, £500 in 500 shares of £1 each. Manufacturers of and dealers in fire fighting appliances of all kinds, and parts and accessories, including chemicals and liquids for use therewith, etc. Directors: E. V. Sheppard, L. E. Entwistle. Registered office: 36 Lime Street, E.C.3.

London Grinding, Ltd. (373,490). Private company. Capital: £2000 in 2000 shares of £1 each. Grinders, pulverisers, crushers, smelters calciners, refiners, bleachers and treaters of raw or prepared materials, oil extractors and refiners, seed crushers, soap boilers, cake and oil manufacturers, chemists, metallurgists, etc. Directors: Gustav Delbanco, Richard C. Latham. Registered office: 63a Fortess Road, Kentish Town, N.W.5.

Chemical and Allied Stocks and Shares

ALTHOUGH again inactive, the stock and share markets have remained firm, sentiment having been aided by news of the British landing in Madagascar. Government securities were inclined to be in larger demand; elsewhere, industrial shares have not been affected by the increased number of air raids. In most directions, absence of selling remained an important market factor, but quotations for many of the smaller-priced and less widely-held stocks and shares were not tested by dealings, owing to the inactive conditions obtaining on the Stock Exchange.

In accordance with the general tendency, only small movements were shown among shares of chemical and kindred companies. Imperial Chemical were again one of the more active securities, and at 33s. 4½d. were slightly higher on balance; the 7 per cent. preference units were firm at 35s. 3d. Borax Consolidated were better, having rallied from 30s. 6d. to 31s. at the time of writing. B. Laporte continued to be quoted at 63s. 9d., awaiting the dividend announcement, while Fison Packard kept at 38s. 9d., and Cooper McDougall at 23s. 6d., but the shares had an inactive appearance. Cellon 5s. ordinary were again around 16s. 3d., aided by the maintenance of the distribution at 20 per cent. Lever & Unilever remained at 25s.; British Oil & Cake preferred ordinary at 41s. 6d. were also the same as a week ago. There were few movements among iron and steel issues. Babcock & Wilcox were 44s. 3d., awaiting the preliminary results for the past year's working. Stewarts & Lloyds were lower at 45s. 4½d., but are now "ex" the dividend, while Tube Investments remained around 81s. 6d., aided by the maintenance of the interim payment. Allied Ironfounders were steady at 24s., and Amalgamated Metal at 15s. were also unchanged on balance. Elsewhere, on further consideration of the results and the chairman's annual statement, General Refractories improved to 9s. 1½d.

British Plaster Board were little changed at 20s. 9d., but Associated Cement had an easier appearance at 45s. 7½d., although Tunnel Cement improved slightly to 40s. United Molasses at 29s. were 3d. better than a week ago, on further consideration of the financial results. Moreover, the units of the Distillers Co. remained firm at 74s. 9d., the assumption being that any falling off in the company's main business may be offset by expansion in the industrial alcohol and other sections. The market remains very hopeful that the dividend of the last-named company may again be 16¼ per cent. Courtaulds at 32s. 9d. were unchanged on balance; among other textile issues, chief attention attached to Fine Cotton Spinners on market hopes that resumption of dividends may be imminent. Although a lower dividend continues to be expected in most quarters, Dunlop Rubber at 25s. 3d., were inclined to improve on the assumption that the recent fall in price may have been carried too far. Nairn & Greenwich were steady at 52s. 6d., but Barry & Staines were inclined to be easier at 26s. 10½d., awaiting the dividend announcement expected towards the end of the month. Lawes Chemical shares transferred at 8s. 9d.

British Drug Houses remained at 26s. 3d., and Boots Drug 5s. ordinary were 32s. 6d. Sangers were 15s. 9d., and Timothy Whites 19s. 6d. Elsewhere, there was a better tendency in Wall Paper Manufacturers deferred units, which moved up to 24s. 9d. Goodlass Wall 10s. ordinary continued to be quoted at 8s. 9d., awaiting the financial results. In other directions, Turner & Newall kept at 65s. 7½d., while British Oxygen at 67s. 9d. were unchanged on balance. British Industrial Plastics were higher, business in these 2s. shares being recorded up to 4s. 4½d., and Lacrinoid Products 2s. ordinary transferred around 3s. Small fluctuations were shown in oil shares.

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Barytes Substitute	French Chalk	Resins (synthetic)	Strontium Salts
Carbonate of Potash	Luminant Pigments	Rubber Accelerators	Synthetic Glues
Caustic Potash (all grades)	Manganese Borate	Sodium Acetate	Talc
Cellulose Adhesives	Methyl Cellulose	Sodium Bichromate	Thio Urea
Chlorinated Rubber	Methylene Chloride	Sodium Chlorate	Urea
Cryolite (Synthetic)	Oxalic Acid and Salts	Sodium Nitrate	Zinc Chloride. Etc., etc.

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CLASSIFIED SECTION

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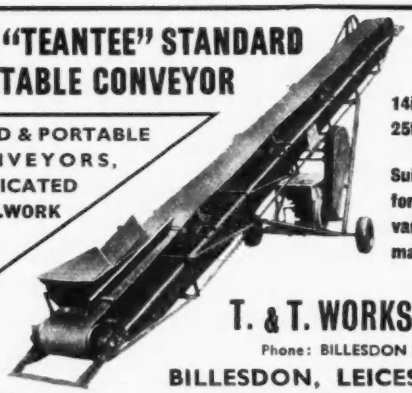

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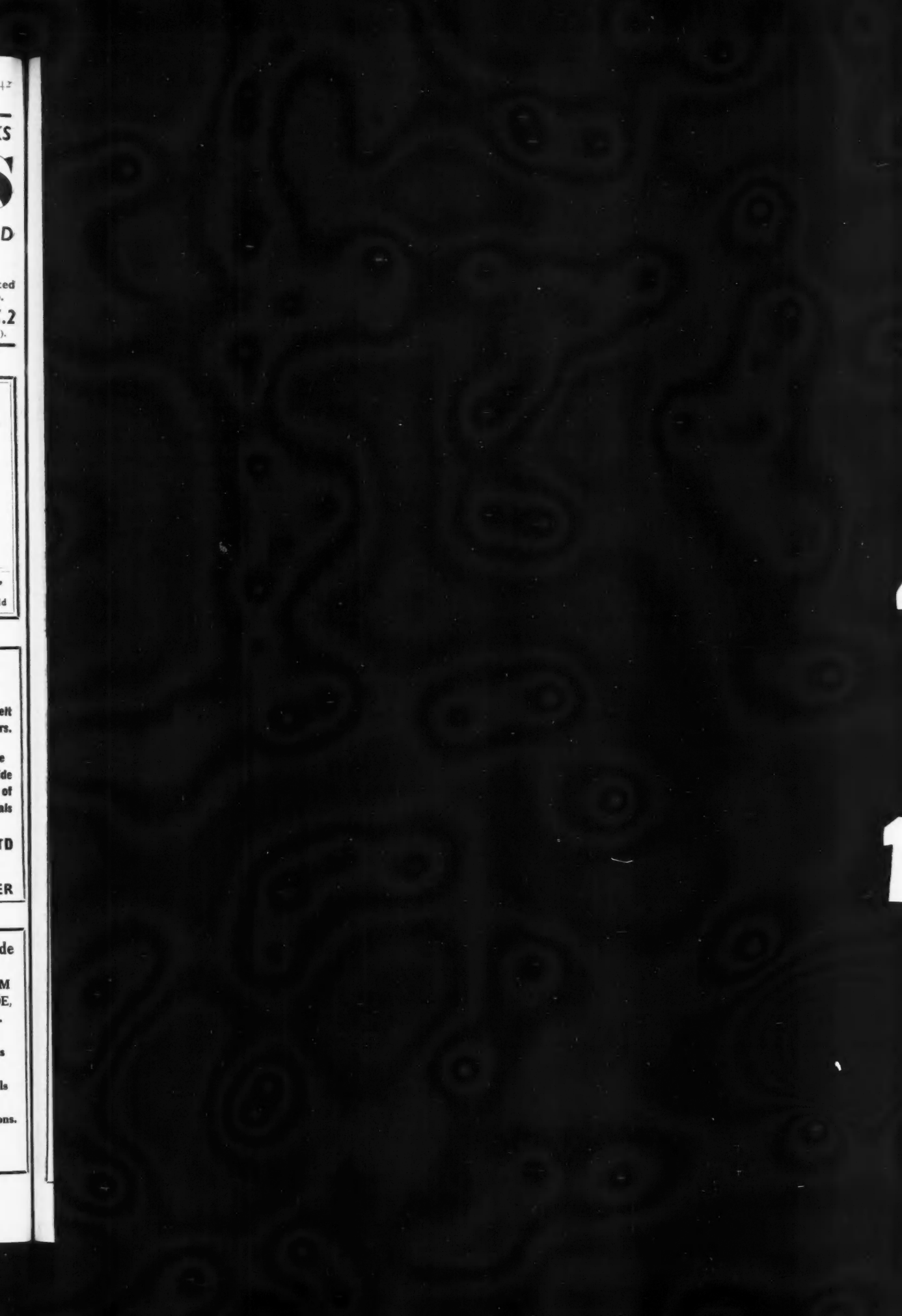

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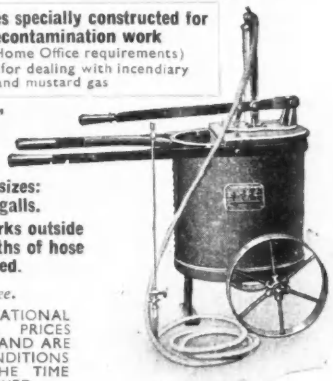

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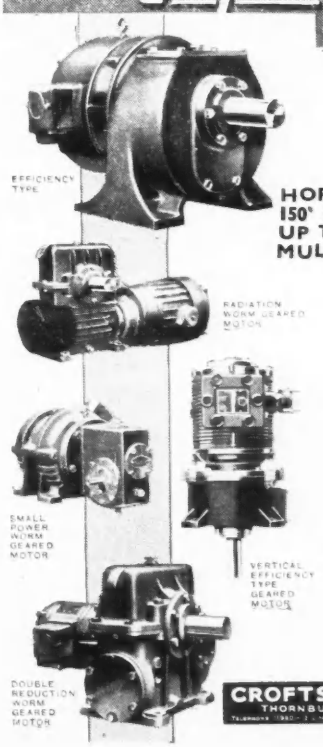
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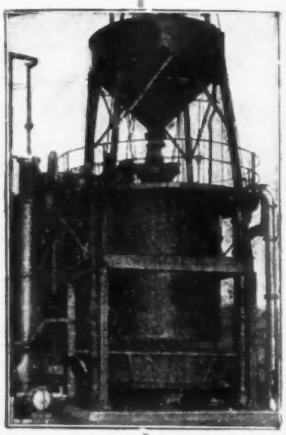

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